SUPPORT FOR THE AMENDMENTS

The present amendment cancels claims 23-41, amends claim 42, and adds new claims 54-59.

Support for the amendment to claim 42, and newly added claims 54-59, is found at specification page 21, lines 7-21, page 25, lines 14-20, page 29, lines 22-25, page 30, lines 15 and 17, and page 40, lines 5-6, 9-10, 14-15 and 20-21.

It is believed that these amendments have not resulted in the introduction of new matter.

REMARKS

Claims 42-59 are currently pending in the present application. Claims 23-41 have been cancelled, claim 42 has been amended, and new claims 54-59 have been added, by the present amendment.

Applicants wish to extend their appreciation to Examiner Szewczyk for providing their undersigned Representative with a copy of the "Hishinuma" reference that was utilized by the Examiner in construing the rejections set forth in the Official Action dated February 25, 2008. Applicants respectfully submit however that the "Hishinuma" reference provided and relied upon by the Examiner is actually an English translation of JP 2001-080939, as opposed to WO 01/17922. Moreover, although WO 01/17922 claims priority to JP 2001-080939, the disclosures of these references are not equivalent. Accordingly, the patentable distinction of the present invention over the disclosure of Nakai (JP 2001-080939) is discussed herein.

The rejection of now cancelled claims 23-41 under 35 U.S.C. §§ 102(b) and/or 103(a) as being anticipated and/or obvious over Nakai (JP 2001-080939) is obviated by amendment.

The rejections under 35 U.S.C. § 103(a) of claims: (1) 42-44 and 48-51 as being obvious over Nakai in view of McMaster (U.S. Patent 4,240,816) and Waibel (Applied Optics); (2) 45 as being obvious over Nakai in view of McMaster, Waibel and Lewis (Hawley's Chemical Dictionary); (3) 46 as being obvious over Nakai in view of McMaster, Waibel and Greenberg (U.S. 2002/0114945); (4) 47 and 52 as being obvious over Nakai in view of McMaster, Waibel and Doushita (U.S. Patent 6,156,409); and (5) 53 as being obvious over Nakai in view of McMaster, Waibel and Niwa (U.S. Patent 6,408,743), is respectfully traversed in part and obviated by amendment in part, with respect to amended claim 42.

Nakai, McMaster, Waibel, Lewis, Greenberg, Doushita and Niwa, when considered alone or in combination, fail to disclose or suggest the presently claimed method. Assuming *arguendo* that sufficient motivation and guidance is considered to have been provided by Nakai, McMaster, Waibel, Lewis, Greenberg, Doushita and/or Niwa to arrive at the presently claimed invention, which is not the case, such a case of obviousness is rebutted by a showing of superior properties. As evidenced by the experimental data presented in the present specification, superior properties with respect to surface compressive stress, strength and adhesiveness are remarkably exhibited by glass sheets coated with a titanium oxide thin film in accordance with the present specification.

Amended claim 42 recites a method for producing a glass sheet coated with a titanium oxide thin film, which comprises applying a titanium element-containing liquid to the surface of a glass substrate having a surface compressive stress of at most 10 MPa at a temperature of 150°C or lower, then heating the liquid-coated surface up to a maximum temperature of from 600 to 700°C, and cooling it to a temperature of 200°C or lower by applying an air jet to both surfaces of the glass substrate under the condition satisfying the following formula (I) to thereby make the glass substrate have a surface compressive stress of from 20 to 250 MPa:

$$0.2 \leq a/t^2 \leq 5 \qquad (1)$$

wherein a represents the time (second) taken in cooling the surface from 500°C to 200°C, t represents the thickness of the glass substrate (mm).

A fundamental difference between the method of the present invention and the disclosure of Nakai is the claimed cooling technique, whereby the liquid-coated surface of the glass substrate is rapidly cooled to a temperature of 200°C or lower by applying an air jet to both surfaces of the glass substrate under the condition satisfying the formula (1) (See e.g., specification at page 27, lines 16-22, and page 28, lines 2-8). In contrast, the glass substrate

of Nakai is gradually cooled without applying cooling air to both surfaces thereof (See e.g., [0014]).

An additional distinction is that the titanium element-containing liquid is applied to the surface of the glass substrate at a temperature of 150°C or lower in accordance with the method of the present invention (See e.g., specification at page 21, lines 16-19), whereas Nakai describes spraying a titanic acid solution to the surface of the glass substrate at a temperature of 250 to 600°C (See e.g., [0015]), which is clearly outside the claimed range of 150°C or lower. In addition, McMaster and Greenberg describe spraying a metal oxide coating composition onto the surface of the glass substrate at a temperature sufficient for pyrolysis, and therefore do not disclose or suggest applying at the claimed temperature of 150°C or lower (See e.g., McMaster at column 3, lines 24-33; and Greenberg at [0043]).

In accordance with the claimed invention, the surface compressive stress of the obtained glass substrate is from 20 to 250 MPa (See e.g., specification at page 30, lines 6-7, and page 31, lines 1-3). In contrast, Nakai is relied upon for the disclosure that "These titanic acid adheres to a glass surface firmly, without there being no crystallinity, and generating internal stress, since it is an infinite form" (See e.g., [0018]). Applicants respectfully submit however that this machine translation is in error and that a correct English translation of Nakai recites that "These titanic acid adheres to a glass surface firmly without generating internal stress, because it is amorphous and has no crystallinity." Therefore, Nakai fails to disclose or suggest the claimed surface compressive stress of the obtained glass substrate of from 20 to 250 MPa. It should also be mentioned that unlike the claimed invention, Waibel describes that the stress of the titanium oxide film (not the substrate) is 152 MPa (See e.g., Table 3).

In the method of the present invention, the liquid-coated surface is heated up to a maximum temperature of from 600 to 700°C in order to provide sufficient toughness and

adhesiveness (See e.g., specification at page 25, lines 1-22). Although Nakai describes spraying a titanic acid solution to the surface of the glass substrate at a temperature of 250 to 600°C (See e.g., [0012], [0015]), Nakai fails to describe heating the coated surface to the claimed temperature of from 600 to 700°C. Moreover, since the surface temperature of the glass substrate of Nakai immediately decreases upon spraying the titanic acid solution thereon, the surface temperature is not adequate for providing sufficient toughness and adhesiveness.

McMaster, Waibel, Lewis, Greenberg, Doushita and Niwa fail to compensate for the deficiencies of Nakai. As a result, Nakai, McMaster, Waibel, Lewis, Greenberg, Doushita and Niwa, when considered alone or in combination, fail to disclose or suggest the presently claimed method. Even if sufficient motivation and guidance is considered to have been provided by one or more of these references to arrive at the presently claimed invention, which is not the case, such a case of obviousness is rebutted by a showing of superior properties.

As discussed in the present specification, Applicants have discovered that the rapid cooling technique of the claimed method enables the glass substrate to retain its surface compressive stress when the condition formula (1) is satisfied, thereby increasing the strength of the glass substrate and improving the adhesiveness of the titanium oxide thin film formed on the surface thereof (See e.g., specification at page 27, lines 16-22, and page 28, lines 2-15). As demonstrated by the experimental data presented in Example 1, the titanium oxide thin film formed on the surface of the glass substrate in accordance with the present invention remarkably exhibited a surface compressive stress of 104 MPa, as well as improved strength and adhesiveness, as evidenced by the pencil hardness test, whereby the titanium oxide thin film formed on the surface of the glass substrate did not peel away despite having been

rubbed with a pencil having a hardness of 6H (See e.g., Example 1 at page 40, lines 5-22, page 42, lines 8-17, and page 43, lines 11-16).

Similar to the glass substrate of Nakai, Example 4 failed to satisfy the condition of formula (1) because the glass substrate was gradually cooled with no cooling air being applied to the surfaces of the liquid-coated surface of the glass substrate. As a result, the glass substrate exhibited a surface compressive stress of nearly 0 MPa, as well as inferior strength and adhesiveness properties, as evidenced by the pencil hardness test, whereby the titanium oxide thin film formed on the surface of the glass substrate completely peeled away after having been rubbed with a pencil having a hardness of only 2H (See e.g., Example 4 at page 46, lines 12-25, page 47, lines 1-7 and 18-23, and page 48, lines 11-16).

This evidence clearly demonstrates that the method of the present invention produces a glass sheet coated with a titanium oxide thin film that remarkably exhibits superior properties with respect to surface compressive stress, strength and adhesiveness, as compared to the inferior properties exhibited by conventional methods.

Withdrawal of these grounds of rejection are respectfully requested.

In conclusion, Applicants submit that the present application is now in condition for allowance and notification to this effect is earnestly solicited.

Respectfully submitted,

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